The Veliger 42(2):132–151 (April 1, 1999)

THE VELIGER


# The Eastern Pacific Sportellidae (Bivalvia)

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*Abstract.* The taxonomy of the eastern Pacific species that have been allocated to the bivalve family Sportellidae is reviewed. All taxa are members of the tropical fauna. The genus *Basterotia* is represented by five species: *B. californica* Durham, 1950, here reported from the Recent fauna for the first time; ***B. obliqua*** and ***B. panamica,*** two new species, the latter the most common eastern Pacific species of *Basterotia* and here reported to brood its young; *B. peninsularis* (Jordan, 1936) (of which *B. hertleini* Durham, 1950, and *B. ecuadoriana* Olsson, 1961, are synonyms); and *B. quadrata* (Hanley, 1834) (of which *Poromya granatina* Dall, 1881, is a synonym). The new genus ***Basterotina*** is described, with the new species ***B. rectangularis*** as its type species; *Basterotina americana* (Dall, 1900) from the Plio-Pleistocene of Florida is also a member of this genus. *Ensitellops* is represented by *E. hertleini* Emerson & Puffer, 1957 (of which *E. pacifica* Olsson, 1961, is a synonym). *Fabella* is represented by *F. stearnsii* (Dall, 1899) (of which *Sportella duhemi* Jordan, 1936, is a synonym). *Sportella californica* Dall, 1899, is an *Orobitella* (Galeommatoidea: Lasaeidae), and *Anisodonta pellucida* Dall, 1916, is based on a juvenile mactrid, probably *Simomactra falcata* (Gould, 1850).

## INTRODUCTION

The Sportellidae is one of four bivalve families currently placed into the Cyamioidea, the others being the Cyamiidae (with the Gaimariidae and Perrierinidae regarded as synonyms), the Bernardinidae, and the Neoleptonidae. This complex is much in need of careful analysis to test whether it really represents a clade and whether all of these families, including the Sportellidae, do as well.

The purpose of the present study was to review the eastern Pacific taxa that have been allocated to the Sportellidae. All the species that remain in the family are members of the Panamic fauna, occurring only south of central Baja California. A short summary of the results of this study was presented in the journal of the San Diego Shell Club (Coan, 1997).

Very little is known about the anatomy or ecology of the Sportellidae. Like other cyamioideans, they have posterior incurrent and excurrent openings, but lack or have only very short siphons. There are only four anatomical accounts of genera that have been placed into this family, and one of them seems instead to represent a galeommatid.

Fischer (1860:23–35, 1886:194) described but did not illustrate the soft parts of *Basterotia quadrata* (Hanley, 1843) (as "*Eucharis*"). Key features mentioned were a mostly fused, strongly papillate mantle, with an oval pedal aperture; separate posterior inhalant and exhalant apertures, the latter forming a short siphon; ctenidia with two demibranchs, the inner larger; and an elongate, extensible, vertically deployed foot, with a linear groove and pit, presumably for a byssus. This account is probably the source of the information Dall (1899:875) provided about this species.

The poorly known genus *Isoconcha* Pelseneer, 1911, *ex* Dautzenberg & Fischer ms, was first made available in an anatomical description and figure of its monotypic species, *I. sibogai.* It was described as having a single posterior aperture, a long ventral aperture, and an incomplete anterior inhalent aperture. The foot was described as being pointed and having a strong byssus. The ctenidium had only one demibranch, in which were found incubating eggs (Pelseneer, 1911:47–48, pl. 16, fig. 12, pl. 17, fig. 1; see also Prashad, 1932:173, pl. 9, figs. 9–12). It was placed in the Sportellidae, with question, by Chavan (1969:541), probably because of its entirely external ligament, but its anterior inhalent aperture suggests that a better placement might be the Galeommatidae, close to *Benthoqueta* Iredale, 1930 (type species, by monotypy: *Turqueta integra* Hedley, 1907:364, pl. 66, figs. 7–10), the soft parts of which were studied by Ponder (1968: 128–131, figs. 5–7).

Ponder (1971:127, 129–131, figs. 34, 37, 38) described and figured the soft parts of *Anisodonta* (*Tahunanuia*) *alata* (Powell, 1952:170). The inhalent and exhalent openings are posterior, with very short siphons for both. There is a ventral pedal gape. The foot lacks a byssal gland. The inner demibranch is more than twice the size of the outer, and labial palps were figured as being small. Juveniles were found attached to the inside ventral shell margin, each by a single byssal thread (Figure 1).

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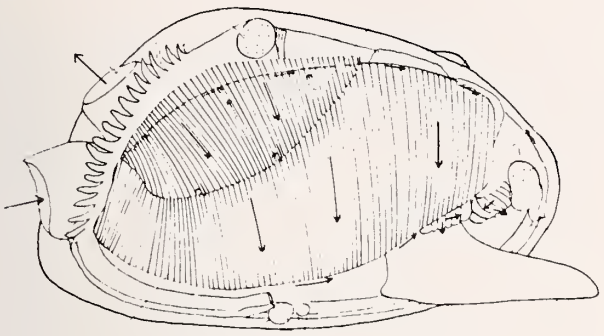

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Figure 1

Animal of *Anisodonta alata* (Powell), after Ponder (1971).

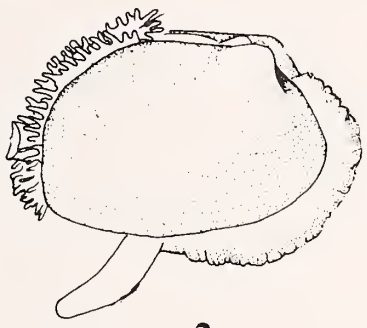

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Figure 2

Animal of *Basterotia angulata* (Dall, Bartsch & Rehder), after Kay (1979).

Finally, Kay (1979:546, fig. 178C; 551; 548, fig. 179L) described and figured the animal of *Basterotia angulata* (Dall, Bartsch & Rehder, 1938) (originally described and in Kay [1979] as "*Anisodonta*")[1]. She mentioned a medium-sized foot without a byssus, posterior inhalent and exhalent apertures, the inhalent with a short siphon (opposite to the situation in *B. quadrata*). The inner demibranch is much larger than the outer (Figure 2).

Unfortunately, nothing is known of the anatomy of living species that have been allocated to *Sportella* (here to *Fabella*).

## FORMAT

In the following treatment, each valid taxon is followed by a synonymy, information on type specimens and type localities, notes on distribution and habitat, and an additional discussion.

The synonymies include all major accounts about the species, but not most minor mentions in the literature. The entries are arranged in chronological order under each species name, with changes in generic allocation from the previous entry, if any, and other notes given in parentheses.

The distributional information is based on specimens I have examined, except as noted. For many species, the available habitat information is sparse; I have summarized the data available.

References are provided in the Literature Cited for all works and taxa mentioned with dates.

The following abbreviations for institutions and collections are used in the text: ANSP—Academy of Natural Sciences of Philadelphia, Pennsylvania, USA; CAS—California Academy of Sciences, San Francisco, California, USA; LACM—Natural History Museum of Los Angeles County, California, USA; MCZ—Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; MNHN—Muséum National d'Histoire Naturelle, Paris, France; NMW—Naturhistorische Museum, Wien (Vienna), Austria; SBMNH—Santa Barbara Museum of Natural History, Santa Barbara, California, USA; UCMP—University of California Museum of Paleontology, Berkeley, California, USA; UF—Florida Museum of Natural History, University of Florida, Gainesville, Florida, USA; UMML—University of Miami Marine Laboratory (Rosenstiel School of Marine and Atmospheric Sciences), Miami, Florida, USA; USNM—United States National Museum collection, National Museum Natural History, Smithsonian Institution, Washington, DC, USA; Skoglund Coll.—collection of Carol C. Skoglund, Phoenix, Arizona, USA.

## DIFFERENTIATING CHARACTERS

A comparative listing of key characters is given in Table 1. A few characters merit additional explanation.

The position of the beaks is given as a percentage of their distance from the posterior to the anterior end. Thus, the beaks of *Ensitellops hertleini* are near the anterior end (80%), whereas those of *Fabella stearnsii* are just posterior to the midline (40%).

The length of the external ligament is given relative to overall shell length. Aside from *Ensitellops hertleini,* which lacks an external ligament, most ligaments are of moderate length (9–13%). Ligaments are short, about 7%, only in *Basterotia quadrata* and ***Basterotina rectangularis.***

The internal part of the ligament is generally located on the medial surface of the nymph (no nymph present in *Ensitellops hertleini*). It is fairly broad in *Basterotia californica,* a narrow band adjacent to the external ligament in most taxa, or "small," being restricted to an area near the beaks, as in *B. quadrata* and *Fabella stearnsii.*

[1] A junior homonym but perhaps also a junior synonym of *B. angulata* (H. Adams, 1871:789), originally proposed as *Eucharis.*

Table 1

Differentiating characters in Eastern Pacific Sportellidae

| | Shape (l/h) | Position of beaks relative to ant. end | Central/ posterior slope demarcation | Sculpture | External ligament | Internal ligament | RV– Cardinal tooth/teeth | LV– Cardinal tooth/teeth | Pallial line | Max. length, mm | Number Recent East. Pacific lots |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Basterotia californica* | ovate-elongate (1.6) | 60–70% | rounded angle | growth checks only | moderate length | wide | projecting, vert. elongate | projecting, horiz. elongate | evenly curved | 12.5 | 29 |
| *Basterotia* ***obliqua*** | ovate-oblique (1.6) | 75–80% | slight angle near beaks | very sparse pustules | moderate length | narrow | projecting, peglike | slightly projecting, narrow | deflected toward PV corner | 10.7 | 4 |
| *Basterotia* ***panamica*** | ovate-trapezoidal (1.6) | 85% | angle rounded to sharp to carinate | densely pustulose | moderate length | narrow to medium | projecting, vert. elongate | projecting, vert. elongate | deflected toward PV corner | 11.0 | 82 |
| *Basterotia peninsularis* | ovate to ovate-trapezoidal (1.7) | 75% | rounded angle | sparsely pustulose near beaks | moderate length | narrow | projecting, vert. elongate | projecting, narrow | deflected toward PV corner | 18.7 | 40 |
| *Basterotia quadrata* | ovate-trigonal (1.1) | 70% | sharply angled to carinate | densely pustulose | short | small | projecting, curved, vert. elongate | projecting, curved | deflected toward PV corner | 14.1 | 13 |
| ***Basterotina rectangularis*** | elongate-rectangular (2-5) | 70% | sharply angled to carinate | densely pustulose | short | narrow | low | on ant. hinge margin | deflected toward PV corner | 11.0 | 8 |
| *Ensitellops hertleini* | elongate (2.5) | 80% | none | sparsely pustulose | none | elongate, narrow | slightly projecting | ant. card. on hinge margin + central card. | evenly curved | 9.4 | 32 |
| *Fabella stearnsii* | ovate (1.7) | 40% | none | growth checks only | moderate length | small | mod. ant. card. + large central card. | large ant. card. + very small central card. | evenly curved | 15.6 | 15 |
| | | | | | | | | Total Lots Examined | | | 223 |

The morphology of the hinge teeth are best understood by comparison to the line drawings (Figures 30–42).

The pallial lines are more or less evenly curved in some species (Figures 30, 31, 41, 42), or are deflected toward the postero-ventral margin in most taxa (Figures 32, 34–40).

## SYSTEMATIC ACCOUNT

### Cyamioidea Sars, 1878:iv, 65[2]
### Sportellidae Dall, 1899:875
### (= Basterotiidae Cossmann, in Cossmann & Peyrot, 1909:25, 133 [of reprint])
### *Basterotia* Mayer, in Hörnes, 1859

*Harlea* Gray, 1842:78, genus without named species. Type species: *Corbula quadrata* "Hinds, 1843," by subsequent designation of Smith, 1890:303. *Nomen oblitum*; see Discussion.

*Eucharis* Récluz, 1850:167. Type species: *Corbula quadrata* "Hinds, 1843," by original designation. *Non Eucharis* Latreille, 1804:175 (Hymenoptera).

*Basterotia* Mayer, in Hörnes, 1859:71–72. Type species: *B. corbuloides* Mayer, in Hörnes, 1859:71–72, by monotypy. Badenian, Middle Miocene; Mikulov, Czech Republic. (See also Hörnes, 1870:40–41, pl. 3, fig. 11)

*Basterotella* Olsson & Harbison, 1953:97. Type species: *Pleurodesma floridana* Dall, 1903:1630, pl. 57, fig. 30, by original designation. Late Pliocene or early Pleistocene of Florida.

**Discussion:** As discussed by Vokes (1981:157, 160), *Harlea* was proposed by Gray (1842) and then resurrected by Smith (1890), but it has never actually been used and is thus a "forgotten name" (*nomen oblitum*). Vokes (1981:157) stated that "the International Commission on Zoological Nomenclature has been requested to suppress the name *Herlea* for purposes of the Law of Priority, but not for the Law of Homonymy," but he evidently never filed a request with the Commission to do so. While a petition to suppress this never-used senior synonym would be called for under the present *Code* (Art. 79), the soon-expected, newly revised *Code* will not require petitions in such clear-cut situations (P. Tubbs, e-mail, 12 June 1997).

As discussed under this species below, the name *Basterotia quadrata* was first made available by Hanley in early 1843, some months before Hinds published it.

*Basterotella* was differentiated from *Basterotia*, s.s., on the basis that it lacks a sharp angle between the central and posterior slopes, has a longer nymph, and is less pustulose externally. However, the holotype of the type species of *Basterotella, Pleurodesma floridana*, has a sharp angle near its umbones as do other specimens I have examined (UF 9846), and Recent taxa belonging to *Basterotia* have every combination and degree of these three characters. For example, *B. miocenica* Vokes, 1981:161–163, described from the late Lower Miocene Chipola Formation of Florida, was unequivocally assigned to *Basterotella*, but varies from having a rounded to a sharp angle (USNM 298652, 298653, 198654; UF 77588). Little point would thus be served in attempting to allocate the species of *Basterotia* to these two subgenera, leaving either a number of species without subgeneric homes or the subgenera so broadly and complexly defined that they would probably be paraphyletic.

**Description:** Shell ovate, ovate-elongate, ovate-trapezoidal, to ovate-trigonal; beaks closer to the posterior end, low to inflated. Central slope set off from posterior slope by an angle in some; angle carinate in some. Surface with irregular growth checks, pustulose in most. Right and left valves with projecting anterior cardinals, that in left valve positioned posterior to that of right valve. External portion of ligament of moderate length to very short in some; nymph weak to strong; internal portion of ligament a relatively small, triangular area adjacent to external portion, often extending to a pit under beaks. Left valve often with an escutcheon; right valve either lacking or with a much less conspicuous escutcheon. Pallial line entire.

Carter & Lutz (1990:7, pl. 61) figured the shell structure of the Hawaiian *Basterotia lutea* (Dall, Bartsch & Rehder, 1938:124–125, pl. 34, figs. 7, 8) (as "*Anisodonta*").

### *Basterotia californica* Durham, 1950

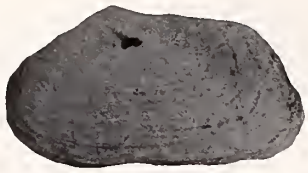
(Figures 3–5, 30, 31)

*Basterotia californica* Durham, 1950:94, 170, pl. 25, figs. 9, 13; Keen, 1971:145 (as a synonym of *B. hertleini*); Bernard, 1983:33 (as a synonym of *B. hertleini*)

**Type material and locality:** UCMP 32668, holotype, left valve, now lost; length, 8.5 mm; height, 4.9 mm; thickness, 1.7 mm (Figure 3a, b). UCB Loc. A3582; Bahía Santa Inez, Baja California Sur (27.1°N, 112.0°W); "from 20-foot terrace level extending from Loc. A3581 to beach"; Pleistocene. (Loc. A3581; W. of Punta Santa Inez, about 0.5 miles from beach, at end of hill; Lower Pliocene).

**Description:** Shell ovate-elongate, length/height about 1.6; beaks at approximately 60–70% of distance to anterior end; anterior end rounded; posterior end subtruncate, tilted anteriorly approximately 20° from vertical. Central slope set off from posterior slope by only a rounded angle. Surface with strong, irregular commarginal growth checks, without conspicuous pustules. Right valve with an elongate, vertical to slightly anteriorly directed, projecting anterior cardinal, and a small, horizontal process attached to it dorsally; left valve with an oblique, projecting, horizontally elongate anterior cardi-

[2] Chavan (1969:537) and Ponder (1971:125) credit this family-level name to Philippi (1845), but I find only the genus *Cyamium* in Philippi (1845:50–51). As far as I have been able to discover, Sars (1878) is the earliest author to use this name.



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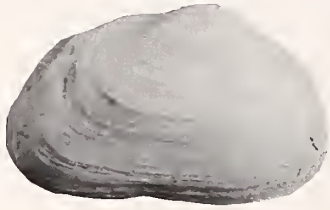

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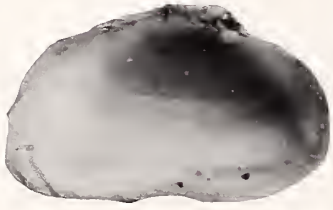

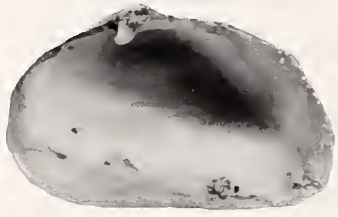

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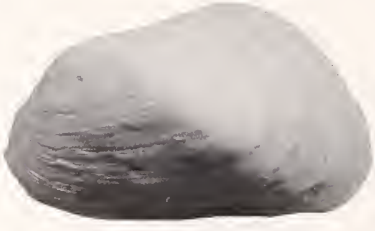

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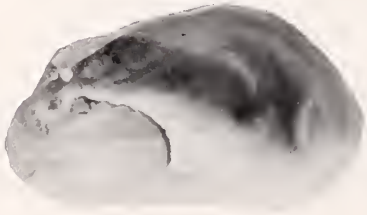

nal, and a conspicuous gap under beaks for cardinal of right valve. External portion of ligament of moderate length, separated from internal portion by a ridge; nymph weak; internal portion wide, extending into a pit under beaks. Pallial line even curved, not deflected toward posteroventral corner. Left valve with an elongate escutcheon; escutcheon weaker, most visible posteriorly in right valve. Length to 12.5 mm (SBMNH 143609; Bahía San Luis Gonzaga, Baja California [Norte]). Additional specimens are illustrated here (Figures 4, 5, 30, 31).

**Distribution:** Northeastern end of Isla Cedros, Baja California [Norte] (28.3°N) (LACM 71-152.30), in the Golfo de California from Los Frailes, Baja California Sur (23.4°N) (Skoglund Coll.), north to Bahía Cholla, Sonora (27.9°N) (Skoglund Coll.), south on the Sonoran coast to Bahía San Carlos (27.9°N) (LACM 78–30.10), Mexico. There are records from the intertidal zone to 100 m (mean, 26 m); the only bottom type noted is sand. There are only two live-collected specimens, SBMNH 144173, from 30 m, and SBMNH 143609, for which no habitat information is available. I have seen 29 Recent lots. Also present in the Pleistocene near Bahía Santa Inez, Baja California Sur (type locality).

**Discussion:** It is unfortunate that the unique holotype of this species has been lost, but the original description and illustrations are sufficient to permit its recognition as a distinct species that is also represented in the Recent fauna of northwest Mexico.

It is most similar to *Basterotia peninsularis,* differing in the following respects: (1) the beaks are closer to the midline; (2) the dorsal and ventral margins are more parallel; (3) the pallial line is more evenly curved, lacking the sharp bend toward the posteroventral margin present in *B. peninsularis*; and (4) the anterodorsal shell margin is not flared and pustulose, as it generally is in *B. peninsularis.* The hinge also differs significantly: the external portion of the ligament is proportionately longer in *B. californica,* the nymph is less conspicuous, and the internal portion extends over a broader, more triangular area. In the right valve, the base of the large cardinal tooth is broader in *B. californica*; in the left valve, the cardinal tooth is more horizontal and less projecting. Juveniles of *B. californica* tend to be proportionately thicker-shelled and those of the other species.

*Basterotia* ***obliqua,*** Coan, sp. nov.

(Figures 6, 7, 32, 33)

**Type material and locality:** LACM 2846, holotype, left valve; length, 9.0 mm; thickness, 2.2 mm (Figures 6, 32); LACM 2847, paratype, right valve; length, 10.1 mm; height, 6.2 mm (Figures 7, 33); LACM 2848, paratype, left valve, length, 8.4 mm. LACM 78–30, 3 mi. S. of Las Tetas de Cabra, Bahía San Carlos, Mexico (27.9°N, 111.1°W); 100 m on bottom of shells, cobbles and silt; Roy & Forest Poorman, April 1978.

**Description:** Shell ovate-oblique, thin; length/height about 1.6; beaks approximately 75–80% of distance to anterior end; anterior end narrowed, rounded; posterior end broad, subtruncate, tilted anteriorly about 30° from vertical; dorsal margin oblique to ventral margin; central slope set off from posterior slope by an obscure angle only near beaks. Surface with irregular commarginal growth checks; pustules sparse, restricted to dorsal and anterior margins in some specimens. Right valve with a narrow, projecting, peglike cardinal; left valve with a narrow, not very projecting cardinal and a gap for cardinal of right valve under beaks. External portion of ligament of moderate length for genus, not separated from internal portion; nymph heavy; internal portion of ligament small, restricted to medial surface of nymph. Pallial line deflected toward posteroventral corner. Left valve with a conspicuous, elongate escutcheon; escutcheon present but less evident in right valve. Length to 10.7 mm (Skoglund Coll.; Los Frailes, Baja California Sur).

**Distribution:** Type lot, see above (27.9°N); Known from only four lots, from 16–100 m (mean, 57 m): Skoglund Coll.—Los Frailes, Baja California Sur (23.4°N); 50–66 m; left valve; LACM 34-20.13—Caleta Tagus, Isla Isabela, Islas Galápagos (0.3°S); 55 m; rock/coral bottom; small, broken left valve; LACM 34–61.16—Bahía Cartago, Isla Isabela, Islas Galápagos (0.6°S); 15–18 m; sand; left valve.

**Discussion and comparisons:** This species differs from *B. peninsularis* in being trapezoidal rather than oval, thinner shelled, in lacking a produced anterodorsal margin, having narrower beaks, and a sharper angle between the posterodorsal and central slopes. In shape, it is closer to *B.* ***panamica,*** but it is thinner, more trapezoidal, and it

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Explanation of Figures 3–7

Figures 3–5. *Basterotia californica.* Figure 3a, b. Holotype, now lost; length, 8.5 mm. Figure 4. Pair, SBMNH 143609; Bahía San Luis Gonzaga, Baja California [Norte]; about 6 m; length, 10.0 mm. Figure 5. Left valve, close-up of hinge; SBMNH 143609; shell length, 5.5 mm. Figures 6, 7. *Basterotia* ***obliqua,*** Coan, sp. nov. Figure 6, holotype, left valve; LACM 2846; length, 9.0 mm. Figure 7, paratype, right valve; LACM 2847; length, 10.1 mm.

has a narrower escutcheon and a thinner hinge. *Basterotia obliqua* differs from *B. oblonga* Smith, 1890 (pp. 303–304, pl. 22, fig. 5), from St. Helena in having a more pronounced angle between the posterior and central slopes near the beaks and a heavier nymph. It differs from *B. lutea* (Dall, Bartsch & Rehder, 1938) from Hawaii in having a longer ligament.

**Etymology:** The name is derived from the oblique shape of the shell of this species.

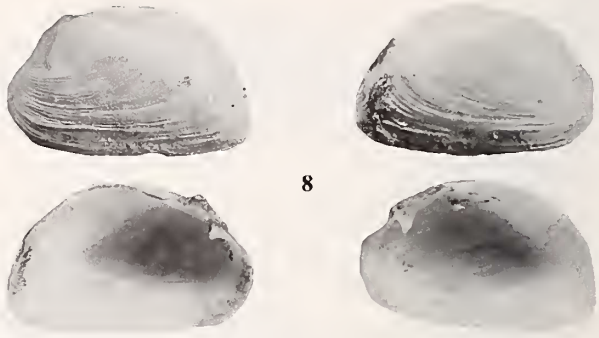
*Basterotia* ***panamica*** Coan, sp. nov.

(Figures 8–10, 34)

?*Basterotia peninsularis* (Jordan), *auctt. non* Jordan, 1936 (see Discussion under *B. peninsularis*). Durham, 1950: 95, 170; pl. 25, figs. 3, 8; Keen, 1958:106, 107, fig. 218 (in part); Keen, 1971:145, 146, fig. 342 (in part)

**Type material and locality:** SBMNH 144168, holotype, complete pair; length, 7.3 mm; height, 4.5 mm; thickness, 3.5 mm (right valve slightly broken on posterodorsal margin) (Figures 8, 34). SMBNH 144169, paratypes, four pairs containing dried animals, 8.1 mm, 7.7 mm, 7.4 mm, 7.4 mm in length. SBMNH 144170, paratypes, two pairs with dried animals, 8.1 mm, 6.9 mm in length. "Tecuan," Jalisco, Mexico (19.3°N, 104.9°W); in estuary mouth under rocks at low tide; Carol C. Skoglund, December 1974.

**Description:** Shell ovate-trapezoidal, length/height about 1.6; beaks approximately 85% of distance to anterior end; anterior end rounded; posterior end subtruncate, tilted anteriorly about 30° from vertical; central slope generally set off from posterior slope by an angle, varying among lots from rounded to sharp to carinate (angle moderate in type lot). Entire surface with dense fine to coarse granules and with strong, irregular commarginal growth checks. Right valve with an elongate, projecting, nearly vertical anterior cardinal and an obscure, short, thick horizontal process attached to it dorsally; left valve with a narrow, vertically elongate, projecting anterior cardinal and a conspicuous gap medial to it for cardinal of right valve. Ligament of moderate length, its external portion on a nymph of moderate strength, slightly divided from its internal portion, which is narrow to medium in width and extends across anterior end of nymph into a pit under beaks. Pallial line deflected toward posteroventral corner. Conspicuous escutcheon present in left valve, smaller or inconspicuous in right valve. When valves closed, anterior and ventral margins gaping, the ventral margin gaping two-thirds of distance to posterior slope. Mantle with a short pedal gape. Posterior end with incurrent and excurrent openings, without siphons (openings very small in dried material). This species broods its young along its ventral mantle margin (Figure 10). Length to 11.0 mm (LACM 71–177.30; Punta San Pablo, Baja California Sur), 10.5 mm (SBMNH 144172; south end of Isla San Marcos, Baja California Sur). An additional specimen is illustrated here (Figure 9).



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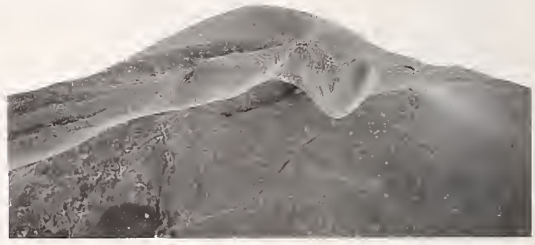

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Explanation of Figures 8–10

Figures 8–10. *Basterotia* ***panamica*** Coan, sp. nov. Figure 8, holotype, pair; SBMNH 144168; length, 7.3 mm. Figure 9. Left valve, close-up of hinge; SBMNH 144171; Bahía San Luis Gonzaga, Baja California [Norte]; about 6 m; length, 6.2 mm. Figure 10. Brood on ventral margin of mantle in a left valve; SBMNH 143659, Cabo San Lucas, Baja California Sur; 12 m; adult shell length, 10.5 mm; juveniles, approximately 0.2 mm.

**Distribution:** Punta San Pablo, Baja California Sur (27.2°N) (LACM 71–177.30, a single right valve with a

broken hinge, the only specimen seen from the Pacific coast of Baja California), into the Golfo de California as far north as Bahía Cholla, Sonora (31.4°N) (SBMNH 14366; Skoglund Coll.), south along the coasts of Mexico and Central America to Salinas, Guayas Province, Ecuador (2.2°S) (CAS 106168), and in the Islas Galápagos at eight stations: Isla Genovesa (0.3°N) (CAS 106384); Isla Isabela (0.3°S) (CAS 106379); Isla Baltra (0.4°S) (LACM 34–46.1); Isla Santa Cruz (0.5°S) (ANSP 154907); Isla Santa Cruz (0.8°S) (CAS 106153); Isla San Cristóbal (0.8°S) (LACM 34–43.20); Isla San Cristóbal (0.9°S) (MNHN); Isla Española (1.4°S) (CAS 106153; LACM 34–283.7).

This species occurs from the intertidal zone to 119 m (mean, 20 m). Live-collected material has been obtained from the intertidal zone to 11 m. Various bottom types are noted on labels, including mud, sand, and rubble; however, live collected material was obtained under rocks, suggesting a nestling habitat. I have seen 82 Recent lots. Perhaps in the Pleistocene of the southern Golfo de California (see Discussion under *B. peninsularis*).

**Discussion and comparisons:** This new species differs from *Basterotia peninsularis* in having a more trapezoidal outline, with a shorter, narrower, more ventrally positioned anterior end and a broader, more truncate posterior end. Its surface is lightly to coarsely pustulose, whereas that of *B. peninsularis* is scarcely pustulose, with pustules chiefly restricted to the antero- and posterodorsal margins. The posterior slope of this new species is separated from the central slope by an angle, which may be sharp or even carinate in some material; there is no such angle in *B. peninsularis*. In the right valve, the small horizontal process dorsal to the cardinal tooth is much less conspicuous; in the left valve, the large cardinal projects more dorsally. The external and internal portions of the ligament of the new species are not separated by a conspicuous ridge medially, as they are in *B. peninsularis*.

The poorly known *Basterotia pustula* Nowell-Usticke, 1971 (pp. 29–30, pl. 5, fig. 1618), described from St. Croix, Virgin Islands, differs in being thinner and more elongate.

Material from the southern end of the distribution of this species is more consistently carinate between the central and posterior slopes and is also more variable. Eventually, this southern material may be found to be taxonomically distinct.

The brooding in this species along the mantle margin is similar to that described for *Anisodonta alata* (Powell, 1952), by Ponder (1968).

**Etymology:** The name is derived from the Panamic province, in which this is the most common species of *Basterotia*.

## *Basterotia peninsularis* (Jordan, 1936)

(Figures 11–15, 35, 36)

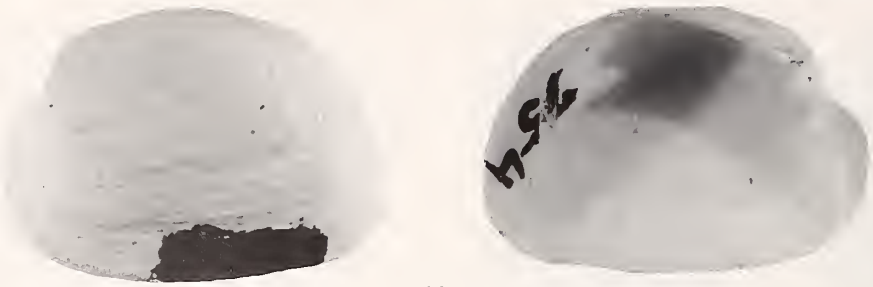
*Anisodonta peninsulare* Jordan, 1936:147, pl. 18, figs. 11, 12; (the following references all as *Basterotia*); Durham, 1950:95 (in part), not pl. 25, figs. 3, 8; Hertlein & Strong, 1947:137; Keen, 1958:106 (in part), not 107, fig. 218; Keen, 1971:145 (in part), not 146, fig. 342; Bernard, 1983:33.

*Basterotia hertleini* Durham, 1950:94–95, 170, pl. 25, figs. 4, 11; Emerson & Hertlein, 1964:355, 357, 358, 359, fig. 4g–j; Keen, 1971:145, 146, fig. 343; Hertlein & Grant, 1972:241–242, pl. 57, figs. 6, 11; Bernard, 1983: 33.

*Basterotia ecuadoriana* Olsson, 1961:243, 509, pl. 36, fig. 8, 8a; Keen, 1971: 145 (as a synonym of *B. hertleini*); Bernard, 1983:33 (as a synonym of *B. hertleini*).

**Type material and localities:** *A. peninsulare*—CASGTC 754.05 (originally 5583), holotype, left valve; length, 15.0 mm; height, 10.6 mm; thickness, 3.8 mm (Figure 11). CAS 754.06 (originally 5584), paratype, right valve; length, 11.2 mm (Figure 12). CAS Loc. 754, north of village, Bahía Magdalena, Baja California Sur (24.6°N, 112.2°W); Pleistocene. *B. hertleini*—UCMP 32274, holotype, left valve; length, 13.2 mm; height, 7.6 mm; thickness, 3.6 mm (Figure 13); UCMP 32328, paratype, left valve; length, 11.5 mm; UCMP 32372, paratype, right valve; length, 10.0 mm; CAS 8581, paratype, right valve; length, 9.9 mm; CAS 8581a, paratype, left valve; length, 11.5 mm. CAS 8581b, paratype, right valve; length, 8.5 mm. UCB Loc. A3670, Puerto Balandra, Isla Carmen, Baja California Sur (26.0°N, 111.2°W); Upper Pliocene; "from sands at left end of outcrop and below base of coral reef." There were also said to be specimens from UCB Locs. A3519 and A3520; Bahía Marquer, Isla Carmen; Upper Pliocene. *B. ecuadoriana*—ANSP 218892, holotype, left valve; length, 12.3 mm; height, 7.7 mm; thickness, 2.3 mm (Figure 14). Manta, Manabi Province, Ecuador (0.1°S, 80.8°W). Paratype, left valve, length, 15.2 mm, not located. Punta Santa Elena, Guayas Province, Ecuador (2.2°S, 81.0°W).

**Description:** Shell ovate to ovate-trapezoidal; length/height about 1.7; beaks approximately 75% of distance to anterior end; anterior end rounded; posterior end subtruncate, tilted anteriorly about 30° from vertical; anterodorsal margin often somewhat flared; dorsal margin often denticulate; central slope set off from posterior slope by only a rounded angle. Surface with irregular commarginal growth checks; pustules, if present, sparse, restricted to small specimens and along dorsal margin of larger specimens. Right valve with a projecting, elongate, vertical anterior cardinal and with a very small anteroposteriorly elongate process attached to it dorsally; left valve with a narrow, vertical, projecting cardinal and a gap under beaks for cardinal of right valve. External portion of ligament of moderate length for genus, separated from internal portion by a ridge; nymph of moderate strength;



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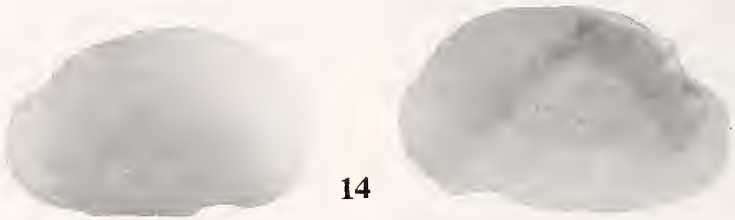

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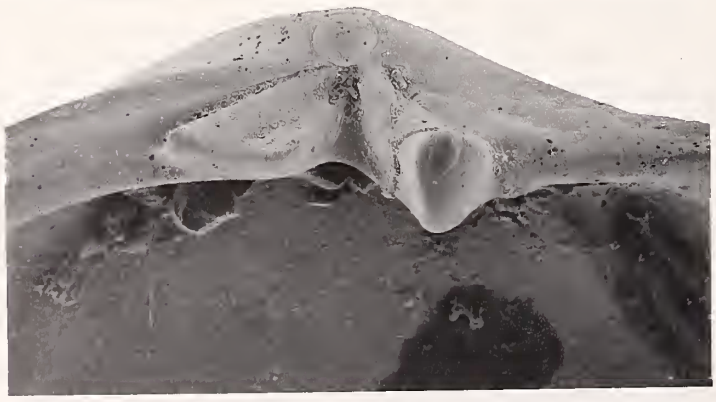

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internal portion of ligament narrow, often with a pit under beaks. Pallial line deflected toward posteroventral corner. Left valve generally with an inconspicuous escutcheon; escutcheon absent or much less evident in right valve. Length to 18.7 mm (MNHN; Punta Santa Elena, Guayas Province, Ecuador). Additional specimens are figured here (Figures 15, 35, 36).

**Distribution:** From Isla Espíritu Santo, Baja California Sur (24.5°N) (CAS 106155), north in the Golfo de California to Bahía Cholla, Sonora (31.4°N) (Skoglund Coll.), Mexico, south to Salinas, Guayas Province, Ecuador (2.2°S) (MNHN; ?CAS 110366), and in the Islas Galápagos on Isla Isabela (0.2°S) (LACM 34–30.11) and Isla Baltra (0.4°S) (LACM 34–46.28). Specimens have been obtained from the intertidal zone to 46 m (mean, 16 m); all material has been obtained dead. I have examined 40 Recent lots. The bottom type most often noted is sand, but some labels mention mud or rocks. Also know from the Pliocene of southern California (Hertlein & Grant, 1972) and of the islands in the southern Golfo de California (Durham, 1950; Emerson & Hertlein, 1964) and the Pleistocene of Bahía Magdalena, Baja California Sur (Jordan, 1936).

**Discussion:** The holotype of *Anisodonta peninsulare* is a very large, oval specimen of the same species that was later named *Basterotia hertleini.* The paratype of *A. peninsulare* is a more typical specimen and is similar to the holotype of *Basterotia hertleini.* The material referred to and illustrated as *B. peninsularis* by Durham (1950) consists of specimens that are strongly carinate and heavily pustulose—UCMP 32271, 32272, 32273; CAS 66787.01; SBMNH 143667—all from UCB loc. A3548; Pleistocene; Isla Coronados, Baja California Sur (26.1°N). These specimens are morphologically intermediate between *B. quadrata* (see below) and *B. **panamica.*** They are thicker-shelled and more regular in shape than *B. quadrata,* and they have a longer ligament and nymph. On the other hand, they are larger than any known specimens of *B. **panamica***; the largest is 13.9 mm in length, and the specimen figured by Durham (1950) is 12 mm in length. Durham's figures were then reproduced in Keen (1958, 1971), forming a mistaken concept of *B. peninsulare* among students of the Recent Panamic fauna. These Pleistocene specimens may be assignable to *B. **panamica,*** or they may represent an evolutionary stage on the way to it.

*Basterotia ecuadoriana* has been generally been synonymized with *B. hertleini.* Olsson differentiated his new species from *B. hertleini,* saying that *B. ecuadoriana* differed in being more elongate and less convex. In actuality, the holotype of *B. hertleini* has a length/width ratio of 1.7, whereas the holotype of *B. ecuadoriana* has a ratio of 1.6. On the other hand, the holotype of *B. ecuadoriana* is indeed flatter, with a thickness/height ratio of 0.3, whereas the holotype of *B. hertleini* has a ratio of 0.5. In any event, these differences are within the range of variability of *B. peninsularis.*

For comparisons with *B. californica,* see under that species. *Basterotia peninsularis* is most similar to the western Atlantic *B. elliptica* (Récluz, 1850:168–169) (synonym: *Corbula newtoniana* C. B. Adams, 1852:240), which differs in being proportionately shorter, more ovate-trapezoidal, in having a shorter, less produced anterior end, and in lacking a denticulate dorsal margin. It also has a still shorter external ligament.

The western Atlantic *Basterotia corbuloidea* (Dall, 1899:885–886, 896, pl. 88, fig. 2, as *Anisodonta*)[3] is smaller and thinner, and its beaks are closer to the anterior end.

### *Basterotia quadrata* (Hanley, 1843)

### (Figures 16–18, 37, 38)

*Corbula quadrata* Hanley, 1843 (early 1843):7, pl. 12, fig. 36; Hinds, 1843 (Nov.):57; Reeve, 1844:pl. 5, fig. 40; Récluz, 1850:168 (*Eucharis*); C. B. Adams, 1852:239–240 (*Corbula*); Hanley, 1856:345 (*Corbula*); Fischer, 1860:23–26 (*Eucharis*); Fischer, 1886:199 (*Eucharis*); Dall, 1899:875, 877 [*Anisodonta* (*Basterotia*)]; Lamy, 1925:505; Olsson, 1961:242 [*Basterotia* (*Basterotia*)]; Bernard, 1983:33, 68 (as "extralimital" to the eastern Pacific).

*Poromya* (?) *granatina* Dall, 1881:109; Dall, 1886:316, pl. 1, fig. 2, 2a, 2b (as *Basterotia quadrata* var. *granatina*); Lamy, 1925;506 (as a variety of *B. quadrata*).

**Type material and localities:** *C. quadrata*—Original specimens missing (K. Way, e-mail, 18 September 1996).

[3] Not a homonym and not to be confused with the type species of the genus, *Basterotia corbuloides.*

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Explanation of Figures 11–15

Figures 11–15. *Basterotia peninsulare.* Figure 11. Holotype of *Anisodonta peninsulare,* left valve; CASGTC 754.05; length, 15.0 mm. Figure 12. Paratype of *A. peninsulare,* right valve; CASGTC 754.06; length, 11.2 mm. Figure 13. Holotype of *Basterotia hertleini,* left valve; UCMP 32274; length, 13.2 mm. Figure 14. Holotype of *Basterotia ecuadoriana,* left valve; ANSP 218892; length, 12.3 mm. Figure 15. Left valve, close-up of hinge; SBMNH 143606; Bahía San Luis Gonzaga, Baja California [Norte]; about 6 m; shell length, 8.8 mm.

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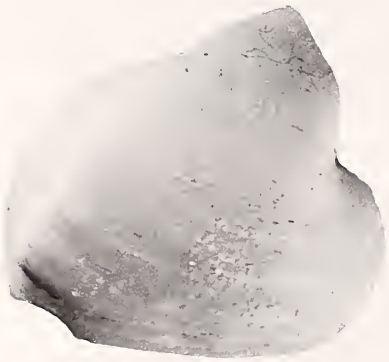

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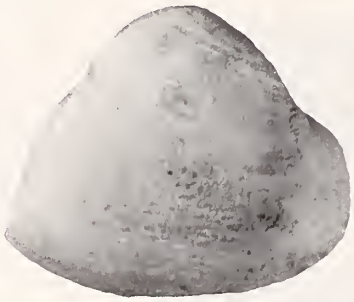

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Hanley's figure measures 9 mm in length and 8 mm in height (Figure 16). Hinds gives the length of his specimen as 6 lines (12.7 mm) and its height as 5 lines (10.6 mm) (Figure 17). Original locality unknown. *P. granatina*—MCZ 8133, holotype, right valve; length, 9.9 mm; height, 6.8 mm; thickness, 3.2 mm (Figure 18). Yucatan Strait; "off Cuba" (a label); 640 fms. (1170 m, probably much too deep to reflect its true habitat).

**Description:** Shell ovate-trigonal, length/height about 1.1; beaks approximately 70% of distance from anterior end, very prominent, inflated, and strongly prosogyrate in some material; anterior end rounded; posterior end rounded to subtruncate, inclined anteriorly about 30° from vertical; central slope divided from posterior slope by a 90° angle near beaks; angle with a carina, most prominent dorsally, broadening toward ventral margin. External surface with coarse pustules and heavy, irregular commarginal growth checks. Posterodorsal margin pustulose. Right valve with a prominent, ventrally projecting cardinal; left valve with a prominent, projecting cardinal. External portion of ligament very short, on a short, sturdy nymph; internal portion small, on medial surface of nymph, extending to a pit under beaks. Narrow to wide escutcheon present in left valve; escutcheon not present in right valve. Pallial line not greatly deflected toward posteroventral margin. Length to 14.1 mm (MNHN; Salinas, Guayas Province, Ecuador). Additional eastern Pacific specimens are illustrated here (Figures 19, 20, 37, 38).

**Distribution:** In the eastern Pacific, from near Isla Partida, Baja California Sur (24.5°N) (LACM 60-6.24), throughout the Golfo de California to its head at Bahía Cholla, Sonora (31.4°N) (Skoglund Coll.), south to Salinas, Guayas Province, Ecuador (2.2°S) (MNHN), and in the Islas Galápagos on Isla Isabela (0.3°S) (CAS 110365) and Isla Santa Cruz (0.5°S) (ANSP 400163). Stations are from 6 to 119 m (mean, 28 m). No bottom types were noted. I have seen 13 Recent eastern Pacific lots. Also present on the Pleistocene 3rd Terrace at Punta Santa Elena, Guayas Province, Ecuador (Hoffstetter, 1948:75; MNHN).

In the western Atlantic, from Cape Lookout, North Carolina (34.3°N) (USNM 94210), on both coasts of Florida, in the Bahamas (C. Redfern, in correspondence, 3 April 1997), south to Haiti (USNM 440430 and other lots), Guadalupe (MNHN), and Colombia (UCMP S-10).

**Discussion:** Although overlooked by previous workers, this species was first proposed in Hanley (1843), which was published early in the year, many months before the name was made available by Hinds (1843) (see Literature Cited for collation of Hanley). While Hanley's figure, an external view, is not unequivocal, interpreting *Corbula quadrata* Hanley as a *nomen dubium* would only create a senior homonym of *Corbula quadrata* Hinds.

Specimens of this species from the eastern Pacific are indistinguishable from those from the Caribbean. This species differs from the very similar *Basterotia (Basterotia) ambona* Vokes, 1981:160–161, 163, figs. 1–3, described from the late Lower Miocene Chipola Formation of Florida, in having a more expanded, denticulate posterodorsal margin; in *B. ambona,* it is more evenly curved and is not denticulate. In the Recent taxon, the posteroventral corner is more pointed, and the hinge teeth seem somewhat broader (material of *B. ambona* examined: USNM 298649, 298650, 298651; UF 77591). Indeed, *B. quadrata* is very close to the Middle Miocene type species of the genus, *B. corbulides,* differing in having a denticulate posterodorsal margin, a more curved ventral margin, and on average a slightly more produced anterior end, and in lacking a depressed area just anterior to the carina, which is in part responsible for the straighter ventral margin, and perhaps in attaining a larger size (material of *B. corbuloides* examined: NMW 1855/XLV/282, 2 paratypes).

Dall (1886:316) cited this species from the Pacific coast, but there are no eastern Pacific specimens in the USNM. His record was repeated with question by Olsson (1961:242) and then dismissed by Bernard (1983:33, 68). However, as can be seen, it does indeed occur in the eastern Pacific in addition to the western Atlantic. Dall (1886:316) also mentioned seeing possible material of this species from Korea. I suspect, however, he may have seen specimens of the Indo Pacific *Basterotia angulata* (H. Adams, 1871:789, 795, pl. 48, fig. 3) (*Eucharis*), which differs from *B. quadrata* in being more elongate and having a longer external ligament, and it has no tendency to form greatly expanded, prosogyrate beaks. *Basterotia angulata* (H. Adams, 1871) is a senior homonym

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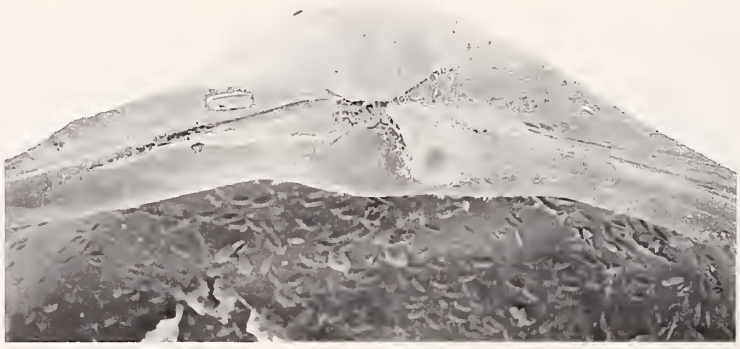
Explanation of Figures 16–22

Figures 16–20. *Basterotia quadrata.* Figure 16. Hanley's (1843) figure; length, 9 mm. Figure 17, Reeve's (1844) figure, probably of Hinds' specimen; length, 12.7 mm. Figure 18. Holotype of *Poromya granatina,* right valve; MCZ 8133; length, 9.9 mm. Figure 19. Right valve; SBMNH 143655; Puerto San Carlos, Sonora, Mexico; 27 m; length, 12.5 mm. Figure 20. Right valve; LACM 72-54.46; Bahía Herradura, Puntarenas Province, Costa Rica; 37 m; length, 9.6 mm. Figures 21–22. ***Basterotina rectangularis*** Coan, gen. & sp. nov. Figure 21. Holotype, right valve; SBMNH 144174; length 11.0 mm. Figure 22. Paratype, left valve; SBMNH 144175; length 7.8 mm.



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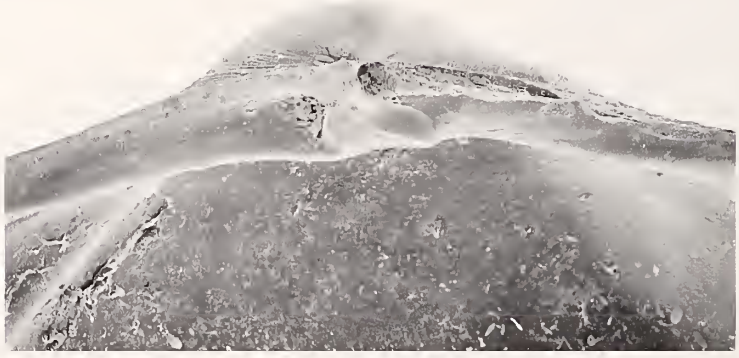

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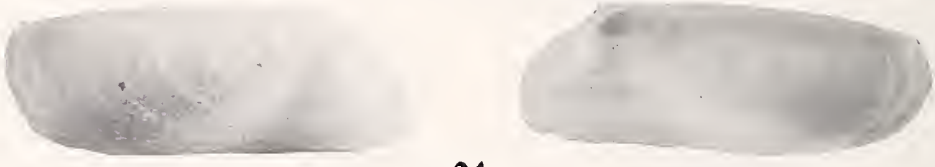

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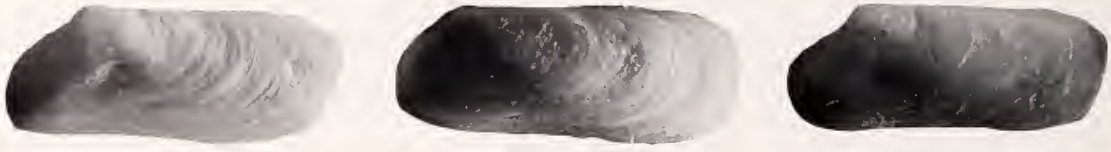

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of *B. angulata* (Dall, Bartsch & Rehder, 1938:125, pl. 34, figs. 5, 6) (*Anisodonta*); however, because it may also be a senior synonym of this Hawaiian taxon, it may not need to be renamed.

### *Basterotina,* Coan, gen. nov.

**Type species:** ***B. rectangularis*** Coan sp. nov.

**Description:** Shell subquadrate; beaks at 70% from posterior end; posterior end truncate; central and posterior slopes separated by an angle, often carinate; surface pustulose. Hinge teeth not projecting, as in *Basterotia.* Right valve with a moderate to obscure cardinal, attached dorsally to an obscure, anteroposteriorly oriented process; left valve with an anterior cardinal formed by hinge margin, fitting anterior to cardinal of right valve. External portion of ligament in a groove, strengthened by a weak nymph most evident posteriorly; internal ligament in an elongate, triangular area. Escutcheon most apparent in left valve. Posterior margin of anterior adductor muscle scar with a radial strengthening rib.

**Discussion and comparisons:** This genus differs from *Basterotia* in having low, non-projecting hinge teeth, but is similar to many species of that genus in having the posterior and central slope separated by an angle and in being pustulose. It differs from the type species of *Anisodonta* Deshayes, 1858:542–543, *A. complanata* Deshayes, 1858:543, pl. 22, figs. 1–4, from the Paleocene of France, in being carinate and pustulose, and in having a greater amount of internal ligament, but is similar in having an internal thickening posterior to the anterior adductor (material of *A. complanata* examined: Senckenberg Museum).

In addition to the following species, *Anisodonta americana* Dall, 1900, from the Miocene of Florida, also belongs in this genus (see additional comparison below).

**Etymology:** The name of this genus is derived from *Basterotia,* suggesting its probable relationship to this genus, with the addition of the diminutive, *-ina.*

### ***Basterotina rectangularis*** Coan, sp. nov.

(Figures 21–23, 39, 40)

**Type material and locality:** SBMNH 144174, holotype, right valve; length, 11.0 mm; height, 5.1 mm; thickness, 2.0 mm (Figures 21, 40). SBMNH 144175, paratype, left valve; length, 7.8 mm (Figures 22, 39). Los Frailes, Baja California, Sur (23.4°S, 109.4°W); 60 m; Pete & Iva Barker, February 1973; *ex* Skoglund Collection.

**Description:** Shell elongate-rectangular, length/height 2.5; beaks approximately 70% of distance to anterior end; anterior end rounded; posterior end broad, truncate, tilted anteriorly about 40° from vertical; posterodorsal margin slightly concave; central slope set off from posterior slope by an angle, which may be carinate in some material. Surface coarsely pustulose, most conspicuously on ends, and with irregular commarginal growth checks. Right valve with an obscure, slightly anteriorly directed, nonprojecting anterior cardinal, with a small, anteroposteriorly elongate process dorsal to it; left valve with a small, slightly projecting anterior cardinal formed by hinge margin. External portion of ligament elongate, on a conspicuous nymph; internal portion narrow, separated from external portion by an obscure ridge. Pallial line deflected toward posteroventral corner. Left valve with a well-defined escutcheon; right valve without one. Anterior adductor muscle scars with a posterior strengthening rib. Length to 11.0 mm (holotype). Two additional specimens are illustrated here (Figure 23).

**Distribution:** East side of Isla Cedros, Baja California [Norte] (28.2°N) (LACM 71–94.27), into the Golfo de California as far north as near Bahía Puertecitos, Baja California [Norte] (30.4°N) (LACM 72–215.19), and Bahía San Carlos, Sonora (27.9°N) (LACM 78–30.9), south to the north side of Isla Salango, Manabi Province, Ecuador (1.6°S) (LACM 80-65.9), from 9 to 100 m (mean, 47 m). The only bottom type noted on labels was sand. This species is thus far known from only eight lots, all obtained dead.

**Other referred material:** CAS 106154—"Gulf of California," Mexico; Skoglund Coll. - Punta San Antonio, Sonora, Mexico; SBMNH 143656 - Bahía Las Palmas, Baja California Sur, Mexico.

**Discussion and comparisons:** This species is most similar to *Basterotina americana* (Dall, 1900:1133, pl. 36, fig. 7; USNM 107808, holotype, right valve) (*Anisodonta*), described from the Caloosahatchee Formation of Monroe County, Florida (late Pliocene or early Pleistocene) and subsequently also figured from beds of similar

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Explanation of Figures 23–26

Figure 23. ***Basterotina rectangularis*** Coan. gen. & sp. nov. (a) Left and (b) right valves, close-up up of hinges; LACM 71–94.27; E. of Isla Cedros, Baja California [Norte]; about 24 m; right valve length, 5.8 mm; left valve length, 4.4 mm. Figures 24–26. *Ensitellops hertleini.* Figure 24. Holotype of *E. hertleini,* left valve; UCMP 11243; length, 8.5 mm. Figure 25. Holotype of *E. pacifica,* left valve; ANSP 218893; length, 5.4 mm. Figure 26, three left valves, showing variability; LACM 40–50.31; Bahía Topoca, Sonora, Mexico; 7.4, 7.4, 7.0 mm.

age at Shell Creek, Florida (Dall, 1903:pl. 57, fig. 23). The Recent species differs in being more elongate, less produced and angled posterodorsally, and more oblique posteriorly; the posterior end of *B. americana* is tilted only about 20–30° from vertical. The ventral margin of the anterior hinge plate in the right valve is not as recessed in the Recent species as it is in *B. americana,* in which this margin forms a slot, and the nymph is less conspicuous, as are the hinge teeth. The thickening posterior to the anterior adductor muscle scar is heavier in *B. americana.*

**Etymology:** The name is derived from the rectangular shape of the shell of this species.

### *Ensitellops* Olsson & Harbison, 1953

*Enstitellops* Olsson & Harbison, 1953:93. Type species: *Sportella protexta* Conrad, 1841:347. Pliocene; North Carolina. (Concerning this species: Campbell, 1993:33, pl. 10, fig. 99.)

**Description:** Shell very elongate, flattened to somewhat inflated, thin, fragile; beaks closer to the posterior end. Surface with irregular commarginal growth checks and scattered pustules. Right valve with a single vertical to anteriorly directed cardinal; left valve with anterior and posterior cardinals. Ligament in a short, posteriorly directed resilifer just within shell margin. Pallial line entire.

### *Ensitellops hertleini* Emerson & Puffer, 1957

### (Figures 24–27, 41)

*Ensitellops hertleini* Emerson & Puffer, 1957:21–22, fig. 2; Keen, 1958:106, 107, fig. 221; Olsson, 1961:242, 509, pl. 36, fig. 9; Keen, 1971:145, 146, fig. 344; Bernard, 1983:33.

*Ensitellops pacifica* Olsson, 1961:241–242, 553, pl. 80, fig. 9, 9a; Keen, 1971:145, 146, fig. 345; Bernard, 1983:33.

**Type material and localities:** *E. hertleini*—UCMP 11243, holotype, left valve; length, 8.5 mm (not 9.5 mm, as originally stated); height, 3.2 mm; thickness, 1.1 mm (Figure 24); UCMP 11325, paratype, right valve, length, 6.2 mm; UCMP 11326, paratype, right valve, length, 4.0 mm. UC Loc. A-3603; Guaymas Harbor, Sonora, Mexico (27.9°N); 4 m; *E. pacifica*—ANSP 218893, holotype, left valve (not right, as stated in text; posterodorsal margin now chipped); length, 5.4 mm; height, 2.8 mm; thickness, 0.6 mm (Figure 25); ANSP 218894, paratype, left valve; length, 4.7 mm; UMML 30.9906, two right valves and four left valves, from type locality, labeled "para" [types] by Olsson. El Lagartillo, Las Tablas, Panama (7.8°N); (in fig. caption in error as "Ecuador").

**Description:** Shell elongate, cylindrical, length/height about 2.5; beaks approximately 80% of distance to anterior end; overall outline somewhat variable, irregular; typically with a broad, obscure furrow from beaks to central slope, which narrows the anterior end; anterior end rounded; posterior end slightly pointed to rounded; degree of valve inflation variable, with some specimens fairly flattened, others more inflated, the two valves varying in degree of inflation with no discernable bias as to which valve is more so. Surface with irregular commarginal growth checks and scattered pustules of variable size. Right valve with an anteriorly curved, slightly projecting cardinal; left valve with a vertical cardinal beneath beaks and an anterior cardinal formed by valve margin. Ligament in an elongate, narrow resilifer within valve margin. Left valve with an escutcheon; escutcheon not apparent in right valve. Pallial line broad, evenly curved. Posterior margin of anterior adductor with a raised ridge. Length to 9.4 mm (LACM 40–43.1; Bahía San Felipe, Baja California [Notre]). Additional specimens are illustrated here (Figure 26, 27, 41).

**Distribution:** From Bahía Cholla, at the head of the Golfo de California (31.4°N) (SMBNH 143664; Skoglund Coll.), south to La Paz, Baja California Sur (24.2°S) (USNM 554978), and Mazatlán, Sinaloa, Mexico (23.2°N) (USNM 565846, 556376); El Lagartillo, Las Tablas, Panama (7.8°N) (type loc. of *E. pacifica*); Santa Elena, Guayas Province, Ecuador (2.2°S) (Olsson, 1961; specimens not located). Other than beach drift, specimens have been obtained from 2 to 35 m (mean, 12 m). Mud and sand bottoms are noted on some labels. I have seen 32 Recent lots.

**Discussion:** Other than size, there seems to be no basis for separating two eastern Pacific species. As yet, this species is known from only two lots obtained south of Mazatlán, Sinaloa, Mexico.

This species differs significantly from the Pliocene to Recent western Atlantic type species of the genus, *E. protexta* (Conrad, 1841), which is flatter, with a more even outline; *E. hertleini* is more inflated and has a narrower, more produced anterior end. The hinge margin is narrower in *E. protexta.* In the right valve, *E. hertleini* has a more anterodorsally elongate cardinal, whereas in *E. protexta* it is more vertical. In the left valve, the posterior cardinal of *E. hertleini* is heavier and more ventrally directed, and the anterior cardinal is on the hinge margin and is anteroventrally directed. In the left valve of *E. protexta,* the posterior cardinal is slightly posteriorly directed, and the anterior cardinal is more ventrally directed. *Ensitellops protexta* has only a slight escutcheon in the left valve, whereas it is more strongly defined in *E. hertleini.*

*Ensitellops hertleini* has been confused in collections with specimens of *Sphenia. Sphenia* is more inflated, and it has only a small cardinal tooth in the right valve; its right has a resilifer under the beaks, and the left valve has a projecting resilifer. *Ensitellops* is still more likely to be confused with small, elongate specimens of *Hiatella.* Small *Hiatella* have a thicker shell, with conspicuous commarginal folds, a more pointed anterior end, and they

often have two external radial rows of spines. The pallial line, if visible, may be seen to consist of a discontinuous series of irregular scars in *Hiatella,* whereas it is continuous in *Ensitellops.* The hinge of *Hiatella* is heavier at an equivalent size, the protoconch is larger, and there is a heavy nymph for the external ligament.

### *Fabella* Conrad, 1863

*Fabella* Conrad, 1863:574, 586. Type species (monotypy): *Amphidesma constricta* Conrad, 1841:347, pl. 2, fig. 15. Pliocene, North Carolina. (Concerning this species: Campbell, 1993:32, pl. 10, fig. 94.).

**Description:** Shell ovate, longer anteriorly. External surface with only commarginal growth checks. Right valve with anterior and central cardinal teeth; left valve with a large anterior cardinal and a small to minute central cardinal. External portion of ligament of moderate length; nymph stout; internal portion of ligament on medial surface of nymph. Pallial line entire.

The following Panamic species was initially placed in *Sportella* Deshayes, 1858:593–595 (type species [original designation]: *Psammotea dubia* Deshayes, 1824 (pp. 76, 6, pl. 10, figs. 13, 14); Middle Eocene, France). *Sportella dubia* differs from taxa here placed in *Fabella* in being equilateral, and it has a longer external ligament and a larger, triangular resilifer.

### *Fabella stearnsii* (Dall, 1899)

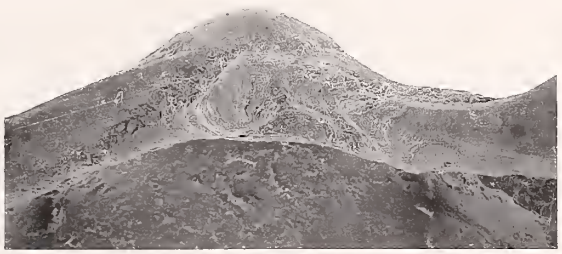
(Figures 28, 29, 42)

*Sportella stearnsii* Dall, 1899:879, 885, 896, pl. 87, figs. 9, 12; Hertlein & Strong, 1947:137–138; Keen, 1958:108, 109, fig. 237; Keen, 1971:143, 145, fig. 341; Bernard, 1983:32 (as *Neaeromya*); Rosewater, 1984:84 (as *Pseudopythina*).

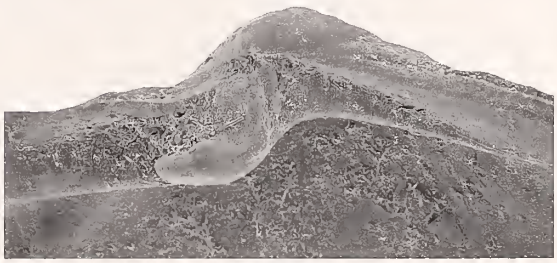
*Sportella duhemi* Jordan, 1936:146–147, pl. 17, figs. 1, 2.

Type material and localities: *S. stearnsii*—USNM 73701, holotype, pair; length, 13.6 mm; height, 10.0 mm; thickness, 5.1 mm (Figures 28, 42). Golfo de California; no other information available; *S. duhemi*—CASGTC 754.04 (originally 5578), holotype, left valve (not right as stated by Jordan); length, 7.5 mm; height, 4.5 mm; thickness, 1.7 mm (Figure 29). CAS Loc. 754, north of village, Bahía Magdalena, Baja California Sur (24.6°N, 112.2°W); Pleistocene.

**Description:** Shell ovate; length/height about 0.7; anterior end much longer, broadly rounded; beaks at approximately 40% of distance from posterior end; posterior end subtruncate. External surface with irregular commarginal growth striae. Right valve with a moderate-sized anterior cardinal and a larger central cardinal. Left valve with a large, oblique anterior cardinal, which fits between cardinals of right valve, and a very small central cardinal. Escutcheon absent. External portion of ligament of moderate length, on a stout nymph; internal portion of liga-



27a



27b

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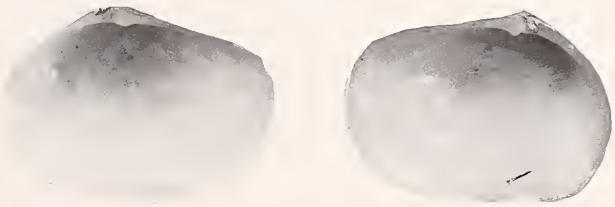

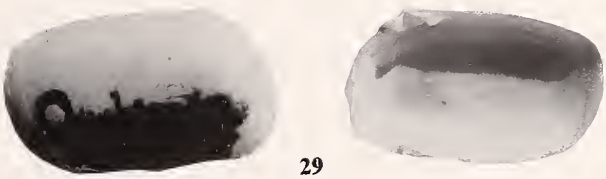

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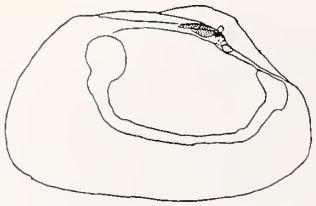
Explanation of Figures 27–29

Figure 27. *Ensitellops hertleini.* (a) Left and (b) right valves, close-up of hinges; SBMNH 13083; Topolobampo, Sinaloa, Mexico; left valve length, 6.9 mm; right valve length, 7.2 mm. Figures 28, 29. *Fabella stearnsii.* Figure 28. Holotype of *Sportella stearnsii,* pair; USNM 73701; length, 13.6 mm. Figure 29. Holotype of *Sportella duhemi,* left valve; CASGTC 754.04; length, 7.5 mm.



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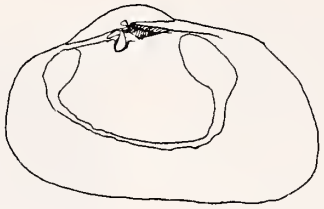

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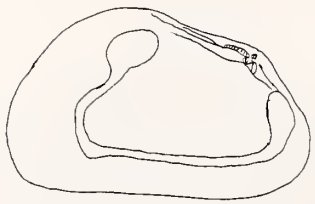

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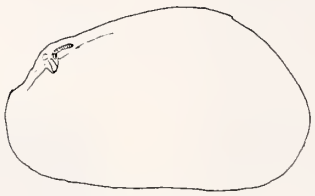

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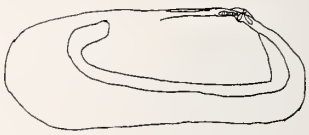

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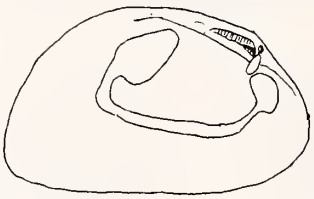

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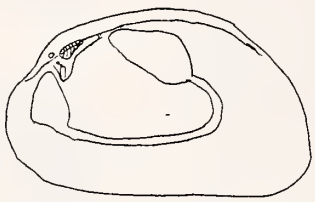

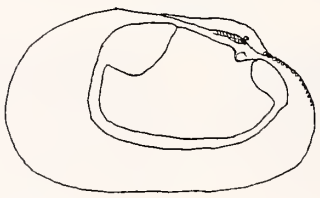

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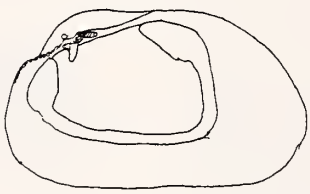

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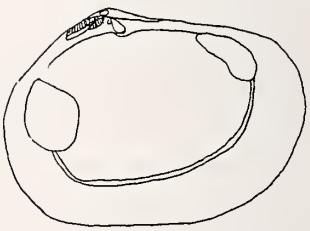

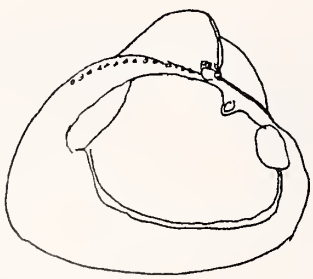

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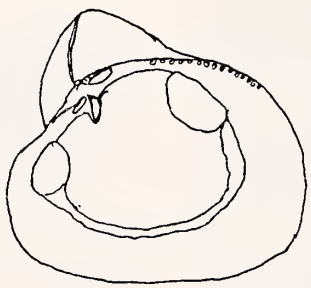

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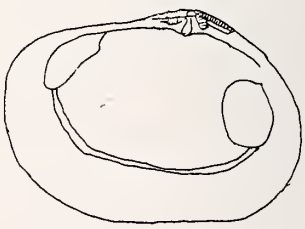

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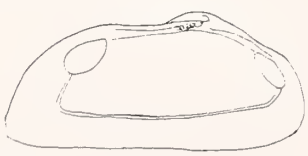

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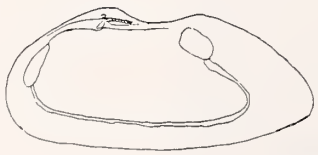

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ment on medial surface of nymph. Pallial line evenly curved. Length to 15.6 mm (CAS 106163; Isla Santa Cruz, Islas Galápagos).

**Distribution:** Puertecitos, Baja California [Norte] (30.3°N) (SBMNH 144176), south to two stations in the Islas Galápagos: Isla Santa Cruz (0.8°S) (CAS 106163) and Isla Española (1.4°S) (CAS 106387). Records are from 4 to 32 m (mean, 13 m). The only bottom types noted are rock and sand. All the available material was collected dead, except for the holotype, for which no exact locality or habitat was recorded. Known from only 15 Recent lots. Also present in the Pleistocene at Bahía Magellan, Baja California Sur (type locality of *S. duhemi*).

**Discussion:** Comparing his specimen to Dall's figures of *S. stearnsii,* Jordan (1936) said that *S. duhemi* had a more rectangular shape and more anterior beaks. However, his specimen falls well within the variation of small specimens in Recent lots that are now available. For example, it is closely similar to the specimen in CAS 106386 from Bahía Santa Inez, Baja California Sur, Mexico.

This species differs from the type species of the genus, *Fabella constricta,* in having a shorter posterior end, more oval outline, and a smaller cardinal in the left valve. The external portion of the ligament in *E. stearnsii* is larger, as is the nymph. *Fabella stearnsii* is most similar to the equally rare Recent western Atlantic *F. pilsbryi* (Dall, 1899:884–885, 897, pl. 88, fig. 9), which has a narrower anterior end.

## EXCLUDED TAXA

*Sportella californica* Dall, 1899 (pp. 885, 897, pl. 88, fig. 5), described from Monterey, California, proves to be an *Orobitella* (Galeommatoidea: Lasaeidae) (holotype: USNM 159293) (Coan & Scott, 1997:12, 25).

*Anisodonta pellucida* Dall, 1916a (p. 30, *nomen nudum*), 1916b (p. 411), also described from Monterey, California, is based on a juvenile mactrid (holotype: USNM 208475), probably *Simomactra falcata* (Gould, 1850: 216).

## ACKNOWLEDGMENTS

I appreciated the assistance of curators and others, who have allowed me to visit collections, to borrow specimens, and to have copies of scarce literature. These include Kenneth J. Boss and Daniel L. Graf, Museum of Comparative Zoology, Harvard University; Philippe Bouchet, Rudo von Cosel, and Philippe Maestrati, Muséum d'Histoire Naturelle, Paris; Raye Germon, Alan R. Kabat, and Thomas R. Waller, National Museum of Natural History, Washington, D.C.; Amanda Diaz, Donald R. Moore, and Nancy Voss, University of Miami; William K. Emerson and Paula Mikkelsen, American Museum of Natural History; Ned S. Gilmore and Gary Rosenberg, Academy of Natural Sciences, Philadelphia; Lindsey T. Groves and James H. McLean, Los Angeles County Museum of Natural History; Ronald Janssen, Natur-Museum Senckenberg, Germany; Elizabeth Kools and Robert van Syoc, California Academy of Sciences; David R. Lindberg and Karen L. Wetmore, Museum of Paleontology, University of California, Berkeley; Roger Portell, Florida Museum of Natural History; Paul H. Scott, Santa Barbara Museum of Natural History; Ortwin Schultz, Naturhistorische Museum, Vienna, Austria; Emily H. Vokes, Tulane University; and Kathie Way, The Natural History Museum, London. I also acknowledge material and information provided by Lyle Campbell, University of South Carolina-Spartanburg; Colin Redfern of Boca Raton, Florida; Carol C. Skoglund, Phoeniz, Arizona; and Philip Tubbs, The Natural History Museum London. I had photographic assistance from California Academy of Sciences SEM technician Darrell Ubick. Sharon Williams provided assistance in preparing the plates. Lyle Campbell and Carol C. Skoglund and one anonymous reviewer provided useful comments on the manuscript.

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### Explanation of Figures 30–42

Figures 30, 31. *Basterotia californica.* Figure 30. Left valve; LACM 71–178.50; Punta San Pablo, Baja California Sur; about 26 m; length, 8.9 mm. Figure 31. Right valve; SBMNH 143609; Bahía San Luis Gonzaga, Baja California [Norte]; about 6 m; length, 12.5 mm. Figures 32, 33. *Basterotia* ***obliqua*** Coan, sp. nov. Figure 32, holotype, left valve; LACM 2846; length, 9.0 mm. Figure 33, paratype, right valve (pallial sinus not visible); LACM 2847; length, 10.1 mm. Figure 34. *Basterotia* ***panamica,*** Coan, sp. nov. holotype, pair; SBMNH 144168; length, 7.3 mm. Figures 35, 36. *Basterotia peninsularis.* Figure 35. Left valve; MNHN; Punta Santa Elena, Guayas Province, Ecuador; length, 18.6 mm. Figure 36. Right valve; CAS 106385; Corinto, Chinandega Province, Nicaragua; length, 13.0 mm. Figures 37, 38. *Basterotia quadrata.* Figure 37. Left valve; LACM 69-24.12; Bahía San Luis Gonzaga, Baja California [Norte], Mexico; 9 m; length 13.0 mm. Figure 38. Right valve; SBMNH 143655; Puerto San Carlos, Sonora, Mexico; 27 m; length, 12.6 mm. Figures 39, 40. ***Basterotina rectangularis*** Coan, gen. & sp. nov. Figure 39. Paratype, left valve; SBMNH 144175; length 7.8 mm. Figure 40. Holotype, right valve; SBMNH 144174; length 11.0 mm. Figure 41. *Ensitellops hertleini,* right and left valves; LACM 40–43.1; Bahía San Felipe, Baja California [Norte], Mexico; 5 m; right valve length, 5.7 mm; left valve length, 9.4 mm. Figure 42. *Sportella stearnsii,* holotype; USNM 73701; length, 13.6 mm.

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